

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF THE CLAIMS:

- 1 1. (Currently Amended) A scanning exposure apparatus
- 2 in which a substrate is exposed by synchronously moving a
- 3 mask and the substrate, the apparatus comprising:
- 4 a beam source which emits pulses of an exposure beam
- 5 in response to trigger signals ~~output at predetermined time~~
- 6 intervals;
- 7 a projection system disposed in a path of the exposure
- 8 beam from the beam source and which projects an image of a
- 9 pattern formed on the mask onto the substrate, the mask to
- 10 be disposed on one side of the projection system and the
- 11 substrate to be disposed on another side thereof;
- 12 a stage disposed on the one side or the other side of
- 13 the projection system and which is movable in a scanning
- 14 direction while holding the mask or the substrate,
- 15 respectively; and
- 16 an interferometer operatively connected to the stage
- 17 and which outputs a measurement value corresponding to

18 positional information of the stage in the scanning
19 direction; and

20 ~~wherein a start timing of the output of the trigger~~
21 ~~signals is controlled based on the measurement value from~~
22 ~~the interferometer~~

23 a controller that controls generation of a series of
24 the trigger signals using a time synchronization trigger
25 method in which the series of the trigger signals are
26 generated at predetermined time intervals, and a start
27 timing of the series of trigger signals is determined based
28 on the measurement value from the interferometer.

1 2. (Currently Amended) A scanning exposure apparatus
2 in which a substrate is exposed by synchronously moving a
3 mask and the substrate, the apparatus comprising:

4 a beam source which emits pulses of an exposure beam
5 in response to trigger signals ~~output at predetermined time~~
6 ~~intervals;~~

7 a projection system disposed in a path of the exposure
8 beam from the beam source and which projects an image of a
9 pattern formed on the mask onto the substrate, the mask to
10 be disposed on one side of the projection system and the
11 substrate to be disposed on another side thereof;

12 a stage disposed on the one side or the other side of
13 the projection system and which is movable in a scanning
14 direction while holding the mask or the substrate,
15 respectively; and

16 an interferometer operatively connected to the stage
17 and which outputs a measurement value corresponding to
18 positional information of the stage in the scanning
19 direction; and

20 ~~wherein a stop timing of the output of the trigger~~
21 ~~signals is controlled based on the measurement value from~~
22 ~~the interferometer~~

23 a controller that controls generation of a series of
24 the trigger signals using a time synchronization trigger
25 method in which the series of the trigger signals are
26 generated at predetermined time intervals, and a stop
27 timing of the series of trigger signals is determined based
28 on the measurement value from the interferometer.

1 3. (Currently Amended) A scanning exposure method in
2 which a substrate is exposed by synchronously moving a mask
3 and the substrate, the method comprising:

4 emitting pulses of an exposure beam from a beam source
5 in response to trigger signals ~~output at predetermined time~~
6 ~~intervals;~~
7 moving a stage which holds the mask or the substrate
8 in a scanning direction;
9 measuring positional information of the stage in the
10 scanning direction using an interferometer which outputs a
11 measurement value corresponding to the positional
12 information of the stage; and
13 ~~determining a start timing of the output of the~~
14 ~~trigger signals based on the measurement value from the~~
15 ~~interferometer~~
16 generating a series of the trigger signals using a
17 time synchronization trigger method in which the series of
18 the trigger signals are generated at predetermined time
19 intervals, and a start timing of the series of trigger
20 signals is determined based on the measurement value from
21 the interferometer.

1 4. (Previously Amended) A scanning exposure method
2 according to claim 3, wherein the beam source emits the
3 pulses of the exposure beam at a predetermined maximum
4 frequency.

1 5. (Original) A scanning exposure method according to
2 claim 4, further comprising:
3 adjusting a scanning speed of the stage in order to
4 supply the substrate with a target exposure amount.

1 6. (Original) A scanning exposure method according to
2 claim 4, further comprising:
3 adjusting intensity of the pulses in order to supply
4 the substrate with a target exposure amount.

1 7. (Original) A scanning exposure method according to
2 claim 4, further comprising:
3 adjusting a width in the scanning direction of an
4 illumination area to which the pulses are directed, in
5 order to supply the substrate with a target exposure
6 amount.

1 8. (Currently Amended) A scanning exposure method in
2 which a substrate is exposed by synchronously moving a mask
3 and the substrate, the method comprising:

4 emitting pulses of an exposure beam from a beam source
5 in response to trigger signals ~~output at predetermined time~~
6 ~~intervals;~~
7 moving a stage which holds the mask or the substrate
8 in a scanning direction;
9 measuring positional information of the stage in the
10 scanning direction using an interferometer which outputs a
11 measurement value corresponding to the positional
12 information of the stage; and
13 ~~determining a stop timing of the output of the trigger~~
14 ~~signals based on the measurement value from the~~
15 ~~interferometer~~
16 generating a series of the trigger signals using a
17 time synchronization trigger method in which the series of
18 the trigger signals are generated at predetermined time
19 intervals, and a stop timing of the series of trigger
20 signals is determined based on the measurement value from
21 the interferometer.

1 9. (Previously Amended) A scanning exposure method
2 according to claim 8, wherein the beam source emits the
3 pulses of the exposure beam at a predetermined maximum
4 frequency.

1 10. (Original) A scanning exposure method according
2 to claim 8, further comprising:
3 adjusting a scanning speed of the stage in order to
4 supply the substrate with a target exposure amount.

1 11. (Original) A scanning exposure method according
2 to claim 8, further comprising:
3 adjusting intensity of the pulses in order to supply
4 the substrate with a target exposure amount.

1 12. (Original) A scanning exposure method according
2 to claim 8, further comprising:
3 adjusting a width in the scanning direction of an
4 illumination area to which the pulses are directed, in
5 order to supply the substrate with a target exposure
6 amount.

1 13. (Currently Amended) A laser apparatus used with a
2 scanning exposure system in which a mask and a substrate
3 are moved during scanning exposure of the substrate, the
4 laser apparatus comprising:

5 a beam source which emits pulses of an exposure beam
6 in response to trigger signals ~~output at predetermined time~~
7 ~~intervals; and~~

8 ~~wherein a start timing of the output of the trigger~~
9 ~~signals is controlled based on a measurement value from an~~
10 ~~interferometer which measures positional information of the~~
11 ~~mask or the substrate~~

12 a controller that controls generation of a series of
13 the trigger signals using a time synchronization trigger
14 method in which the series of the trigger signals are
15 generated at predetermined time intervals, and a start
16 timing of the series of trigger signals is determined based
17 on measurement values from an interferometer which measures
18 positional information of the mask or the substrate.

1 14. (Currently Amended) A laser apparatus used with a
2 scanning exposure system in which a mask and a substrate
3 are moved during scanning exposure of the substrate, the
4 laser apparatus comprising:

5 a beam source which emits pulses of an exposure beam
6 in response to trigger signals ~~output at predetermined time~~
7 ~~intervals; and~~

8 ~~wherein a stop timing of the output of the trigger~~
9 ~~signals is controlled based on a measurement value from an~~
10 ~~interferometer which measures positional information of the~~
11 ~~mask or the substrate~~

12 a controller that controls generation of a series of
13 the trigger signals using a time synchronization trigger
14 method in which the series of the trigger signals are
15 generated at predetermined time intervals, and a stop
16 timing of the series of trigger signals is determined based
17 on measurement values from an interferometer which measures
18 positional information of the mask or the substrate.

1 15. (Currently Amended) A device manufacturing method
2 including scanning exposure process in which a substrate is
3 exposed by synchronously moving a mask and the substrate,
4 the method comprising:

5 emitting pulses of an exposure beam from a beam source
6 in response to trigger signals ~~output at predetermined time~~
7 ~~intervals;~~

8 moving a stage which holds the mask or the substrate
9 in a scanning direction;

10 measuring positional information of the stage in the
11 scanning direction using an interferometer which outputs a

12 measurement value corresponding to the positional
13 information of the stage; and
14 ~~determining a start timing of the output of the~~
15 ~~trigger signals based on the measurement value from the~~
16 ~~interferometer~~
17 generating a series of the trigger signals using a
18 time synchronization trigger method in which the series of
19 the trigger signals are generated at predetermined time
20 intervals, and a start timing of the series of trigger
21 signals is determined based on the measurement value from
22 the interferometer.

1 16. (Currently Amended) A device manufacturing method
2 including scanning exposure process in which a substrate is
3 exposed by synchronously moving a mask and the substrate,
4 the method comprising:
5 emitting pulses of an exposure beam from a beam source
6 in response to trigger signals ~~output at predetermined time~~
7 ~~intervals;~~
8 moving a stage which holds the mask or the substrate
9 in a scanning direction;
10 measuring positional information of the stage in the
11 scanning direction using an interferometer which outputs a

12 measurement value corresponding to the positional
13 information of the stage; and
14 ~~determining a stop timing of the output of the trigger~~
15 ~~signals based on the measurement value from the~~
16 ~~interferometer~~
17 generating a series of the trigger signals using a
18 time synchronization trigger method in which the series of
19 the trigger signals are generated at predetermined time
20 intervals, and a stop timing of the series of trigger
21 signals is determined based on the measurement value from
22 the interferometer.

1 17. (Currently Amended) A scanning exposure method
2 according to claim 3, further comprising:

3 ~~rotating~~ adjusting an optical member disposed in the
4 path of the exposure beam, in order to adjust an intensity
5 distribution of the exposure beam in a non-scanning
6 direction perpendicular to the scanning direction.

1 18. (Previously Added) A scanning exposure method
2 according to claim 17, wherein the exposure beam has an
3 intensity distribution in the scanning direction, wherein

4 the intensity distribution in the scanning direction has
5 slope portions at the edges thereof.

1 19. (Currently Amended) A scanning exposure method
2 according to claim 17, wherein the optical member includes
3 ~~a field~~ an adjustable stop.

1 20. (Currently Amended) A scanning exposure method
2 according to claim 8, further comprising:
3 ~~rotating~~ adjusting an optical member disposed in the
4 path of the exposure beam, in order to adjust an intensity
5 distribution of the exposure beam in a non-scanning
6 direction perpendicular to the scanning direction.

1 21. (Previously Added) A scanning exposure method
2 according to claim 20, wherein the exposure beam has an
3 intensity distribution in the scanning direction, wherein
4 the intensity distribution in the scanning direction has
5 slope portions at the edges thereof.

1 22. (Currently Amended) A scanning exposure method
2 according to claim 20, wherein the optical member includes
3 ~~a field~~ an adjustable stop.